C55.36:ERL ARL-12

AEROSOL OPTICAL DEPTH AND RATIO OF DIFFUSE-SKY TO TOTAL SOLAR IRRADIANCE MEASURED FROM AIRCRAFT FOLLOWING THE ERUPTION OF EL CHICHON

Ellsworth G. Dutton
John J. DeLuisi

Air Resources Laboratories
Silver Spring, Maryland
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Boulder, Colorado

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Aerosol Optical Depth and Ratios of Diffuse-Sky to Total Solar Irradiance Measured from Aircraft Following the Eruption of El Chichon

Ellsworth G. Dutton and John J. DeLuisi

Abstract. Spectral aerosol optical depth and relative measurements of diffuse and total solar irradiance fields were made from an aircraft flying in the upper troposphere following the April 1982 eruption of El Chichon. Two series of flights were flown, one in December 1982-January 1983 and the other in May 1983. The optical depth measurements reveal the latitudinal distribution of the stratospheric volcanic debris between 50°N and 6°S latitude for December-January and 72°N and 56°S for May. The ratios of the downward diffuse to the downward total solar irradiance and albedo at aircraft altitude are given for times determined to be cloud free above the aircraft. This report describes the acquisition of and access to the data obtained on the flights, and presents edited results in summary graphical and tabular form.

1. Introduction

Measurements of spectral aerosol optical depth, ratios of diffuse-sky to total (direct plus diffuse) solar irradiance, and albedo were obtained on the NASA Convair 990 (CV-990) during flights made between 9 December 1982 and 4 January 1983 and between 4 and 20 May 1983. These flights followed the eruption of El Chichon and were intended to survey the latitudinal variation of the radiative effects of the volcano's stratospheric debris cloud. The measurements were made in the uppermost levels of the troposphere. The flights covered latitude ranges of 50°N to 6°S in the December-January period and 72°N to 56°S in the May period. A special issue of Geophysical Research Letters (Pollack et al., 1983) describes the December-January flights and some of the related results from the many participants. Dutton and DeLuisi (1983) give a summary of the spectral aerosol optical

depths that we obtained on those December-January flights. This present report further describes and summarizes the spectral optical depth measured on both flight series and describes access to the complete numerical record. It also includes a discussion of the ratios of diffuse to total irradiance, and albedo (hemispherical reflectance), as measured every 30 seconds on each CV-990 flight. The measured ratios can be compared with radiative models, which incorporate the measured albedo and optical depths to determine aerosol absorption, following the procedures of Herman et al. (1975) for clear-sky cases.

The complete numerical values for the aerosol optical depth, the ratios of diffuse to total irradiance, and the albedo observations are available from the authors on computer media and/or printed listings. Appendix A of this report includes descriptions of those files and definitions of variables used in them; Appendix B gives summaries of optical depth data; and Appendix C gives summaries of ratios of diffuse-sky to total irradiance, and albedo values.

2. Aerosol Optical Depth

Spectral aerosol optical depth can be determined from sunphotometer measurements of the direct solar beam. The procedure we used is a common practice discussed frequently in the literature (e.g., Dutton and DeLuisi, 1983). See Shaw (1983) for a summary. The sunphotometer measurements on board the CV-990 were made through four quartz optical windows, two mounted on each side of the aircraft. The transmission characteristics for each of the optical windows were determined before and after the

windows were installed into the aircraft and between flights whenever possible. The window transmission was measured by making pairs of solar intensity measurements, one through the window and the other without the window. This was accomplished between flights on the ground, with the window installed, by using the sunphotometers and repeatedly moving from the window to an open door. Also, window transmission as a function of solar incident angle was determined.

The sunphotometers were calibrated before and after each of the flight series, using both Langley plot calibrations and intercomparisons with other calibrated instruments. The discussion by Dutton and DeLuisi (1983) relative to the calibration and data reduction process for the December-January flights also applies for the May flights.

Summaries of the aerosol optical depth from both flight series are shown in Appendix B in Figs. B1 and B2 for 500 nm and in Tables B1 and B2 for several wavelengths. The complete numerical values for all observed wavelengths available from the authors are described in Appendix A. The wavelengths of the observations were 380, 500, 675, and 778 nm during the December-January series and 380, 500, 675, 778, and 862 nm during May. Figures B1 and B2 show the latitudinal distributions of the stratospheric aerosol for December-January and for May, respectively. Although most of the measured optical depth is due to El Chichon, DeLuisi et al. (1985) attribute a small part (<0.02) to the "Mystery Cloud," and some part ($\simeq$0.002) to stratospheric background. Interesting features in Fig. B1 include the Northern

Hemisphere tropical maximum and the minimum at 30°N, and in Fig. B2 include the maximum north of 50°N.

The spectral aerosol optical depths given in Tables B1 and B2 are averages of consecutive measurements within 2° latitude bands; the most northerly integer latitude is listed for the band. Also given in Tables B1 and B2 are estimates of uncertainties and the number of observations in the average. The uncertainty given is the sum of the standard deviation of the average and the estimated instrument error. The spectral optical depth shows a maximum between 500 and 675 nm for most of the December-January results and a spectral shape that is flat to slightly decreasing with increasing wavelength in May.

3. Diffuse-Sky and Total Radiation Measurements

Stratospheric aerosols can interact with incoming solar radiation in one of two ways. Either the particles scatter radiation or absorb it. Aerosol optical depth is indicative of the combined scattering and absorption. Of the scattered portion, some will be directed upward toward space and some downward toward the troposphere. Diffuse-sky radiation from the stratosphere is affected by only the downward-scattered fraction. To determine just the absorption fraction, measurements of the ratio between the downward diffuse and downward total (diffuse plus direct) solar irradiance can be compared with radiative transfer calculations, using the technique of Herman et al. (1975).

We made relative (linearly proportional) measurements of both the downward diffuse and downward total solar irradiance

from the CV-990 using a radiometer with three spectral sensors. A highly accurate ratio between these two relative measurements was obtained because both were obtained by a single sensor thereby canceling many usual instrument biases. This was accomplished by using an oscillating shadeband, which periodically shaded a given sensor. The radiometer configuration used was similar to the one described by Wesely (1982) and the continuous diffuse/total radiometer designed for ground-based applications described by Dutton et al. (1985). Irradiance ratios were obtained simultaneously for three spectral bands by using a cluster of three different sensors: 350-1100 nm, pyranometer (PY); 400-700 nm, photometer (PH); and 770-790 nm, infrared (IR). Each sensor had a 2-pi steradian field-of-view (FOV).

The oscillating shadeband was arranged such that regardless of the instrument's azimuthal orientation each sensor would be shaded (the diffuse measurement) once per sweep and the band would recess completely out of the FOV (the total downward measurement) at the beginning and end of the sweep. The sweep rate was twice per minute, which resulted in each sensor being shaded for about 0.7 seconds and being totally unobstructed for about 4 seconds per sweep. The sensor output voltages were sampled at 50 Hz, and 0.1-s average values were recorded on magnetic tape.

The diffuse/total radiometer was mounted in a zenith port forward of center on the top of the CV-990. From this location the sensors were level and had an unobstructed view of the upward hemisphere, except for a minor obstruction by the vertical stabilizer when the aircraft was flying with 0.0^{o} roll and a 2.0^{o}

nose-up pitch. In the post processing, data were discarded if the aircraft orientation was outside ~2.0° of sensor level. The interference of the stabilizer was considered insignificant except if it blocked the direct beam.

Figure C1 shows a typical output signal during ten sweeps of the shadeband under cloudless skies. The sensor used was fully shaded from the direct sun at the times indicated by the bottom of the downward spikes in the data. Some diffuse radiation is also blocked by the sweeping shadeband as it shades the sensor, as indicated by the slight decrease in the signal before and after each spike. The difference between the total signal and the signal just before and after the shadeband shades the sensor is due to diffuse radiation blocked by the shadeband. This difference must be added to the diffuse signal to account for the blocked diffuse radiation. To calculate the diffuse/total ratio, the corrected diffuse signal is then divided by the total signal. The diffuse correction as well as the diffuse/total ratio was calculated for each sweep of the shadeband for each of the 20 6- to 7-h flights for each of the three sensors. Data were discarded if the 10-Hz irradiance data variability showed evidence of aqueous cloud interference or if aircraft pitch or roll exceeded 2.0° off the instrument level.

The diffuse-sky to total (DI/TO) irradiance ratios for cloud-free cases from the CV-990 flights are given in Tables C1-C6 in Appendix C. Also given in the data tabulation for each observation are the day of year (DOY), integer latitude (LAT), solar elevation (SO.EL.), average albedo (ALBE.), standard

deviation of albedo (AL.SD.), standard deviation of DI/TO (DT./SD.), number of clear-sky observations (N), pressure altitude in feet (PALT), and average longitude (LONG). The values presented in Tables C1-C6 are averages of consecutive measurements within 1^{o} of latitude for a given flight (day). Complete unaveraged data available from the authors are described in Appendix A.

Albedo, aerosol optical depth, and a radiative transfer model are required to determine aerosol absorption from the measured clear-sky diffuse/total ratios (Herman et al., 1975). Albedo was obtained on the CV-990 from the continuous output of three downward-facing sensors, located in a nadir port, ratioed to the appropriate output of the three identical sensors in the upward-facing diffuse/total radiometer. To assure accurate albedo calculation, the two sets of sensors were compared side by side before and after each flight series.

4. References

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Herman, B.M., R.S. Browning, and J.J. DeLuisi, 1975. Determination of the effective imaginary term of the complex refractive index of atmospheric dust by remote sensing: The diffuse-direct method. J. Atmos. Sci. 32:918-925.

Pollack, J.B., O.B. Toon, E.F. Danielson, D.J. Hoffman, and J.M. Rosen, 1983. The El Chichon volcanic cloud: An Introduction. Geophys. Res. Lett. 10:989-992.

Shaw, G.E., 1983. Sun photometry. Bull. Amer. Meteorol. Soc. 64:4-10.

Wesely, M.L., 1982. Simplified techniques to study components of solar radiation under haze and clouds. J. Appl. Meteorol. 21:373-383.

Appendix A: File Descriptions and Variable Definitions

Included here are descriptions of, and Fortran formats for, files containing aerosol optical depth and ratios of diffuse to total irradiance that are available on computer media and/or listings from the authors. Request master file ELACDAT, which contains the following eight files. Variable definitions are given following the file descriptions.

Files

FILE 1. Spectral aerosol optical depths measured on board NASA CV-990 during Dec. 1982 and Jan. 1983.
Variables -- DOM,MON,YR,GHR,MIN,FLG,LAT,LONG,SOEL,RAM,PRES, T380,T500,T675,T778
Format -- (1X,3I2,1X,2I2,1X,F5.1,1X,2F7.2,1X,F5.2,1X,F6.3, 1X,F4.0,1X,4F7.3)

FILE 2. Spectral aerosol optical depths measured on board NASA CV-990 during May 1983.
Variables -- DOM,MON,YR,GHR,MIN,FLG,LAT,LONG,SOEL,RAM,PRES, T380,T500,T675,T778,T862
Format -- same as File 1, except ..., 5F7.3)

FILE 3. Reflectance and ratios of global diffuse-sky to global total irradiance as measured by LICOR Photometric sensors flown on the NASA CV-990 during Dec. 1982 and Jan. 1983.
Variables -- YR,MON,GHR,MIN,LAT,LONG,SOEL,DTRAT,REF,PALT
Format -- (1X,4I4,2I5,1X,F4.1,1X,2F6.3,1X,F8.0)

FILE 4. Same as File 3, except LICOR IR sensors used.
Variables -- same as File 3.
Format -- same as File 3.

FILE 5. Same as File 3, except LICOR pyranometric sensors used.
Variables -- same as File 3.
Format -- same as File 3.

FILE 6. Reflectance and ratios of global diffuse sky to global total irradiance as measured by LICOR photometric sensors flown on the NASA CV-990 during May 1983.
Variables -- same as File 3.
Format -- same as File 3.

FILE 7. Same as File 6, except LICOR IR sensors used.
Variables -- same as File 3.
Format -- same a File 3.

FILE 8. Same as File 6, except LICOR pyranometric sensors used. May 1983.
Variables -- same as File 3.
Format -- same as File 3.

Variable Definitions

DOM	Day of month
DTRAT	Ratio of diffuse sky to total sky irradiance within specified spectral interval
FLG	Flag (unused)
GHR	Hour (GMT) (if hour is GMT then so is day and/or month)
LAT	Latitude (decimal degrees)
LONG	Longitude (decimal degrees)
MIN	Minute
MON	Month
PALT	Flight level pressure altitude (ft)
PRES	Flight level pressure (mb)
RAM	Relative air mass
REF	Reflectance (global)
SOEL	Solar elevation (decimal degrees)
Txxx	Aerosol optical depth at wavelength xxx (nm)
YR	Year

Appendix B: Summaries of Optical Depth Data

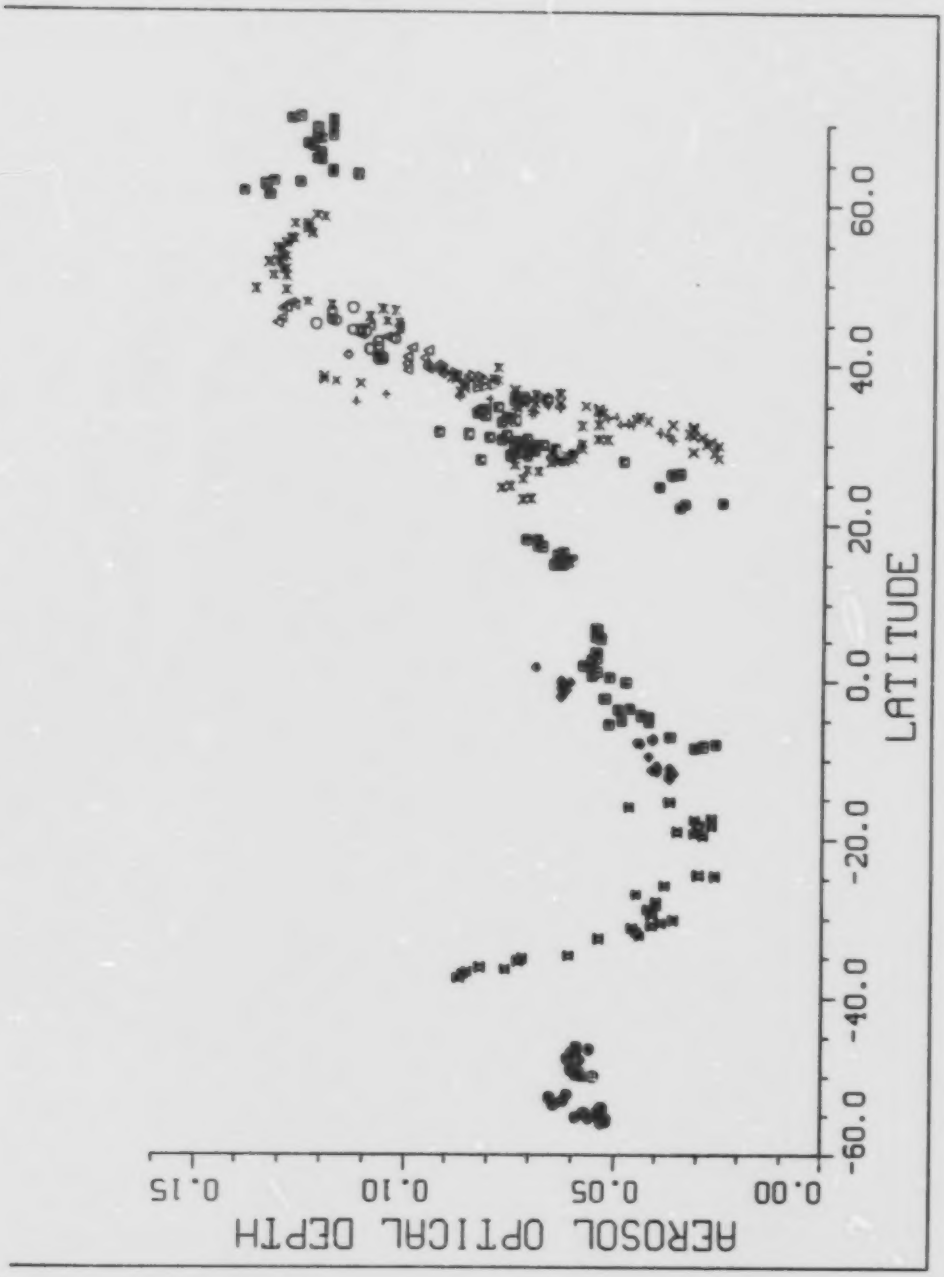

Figure B1.--Latitudinal distribution of aerosol optical depth (500 nm) during 9 December 1982 to 4 January 1983. Different symbols indicate flights on different days.

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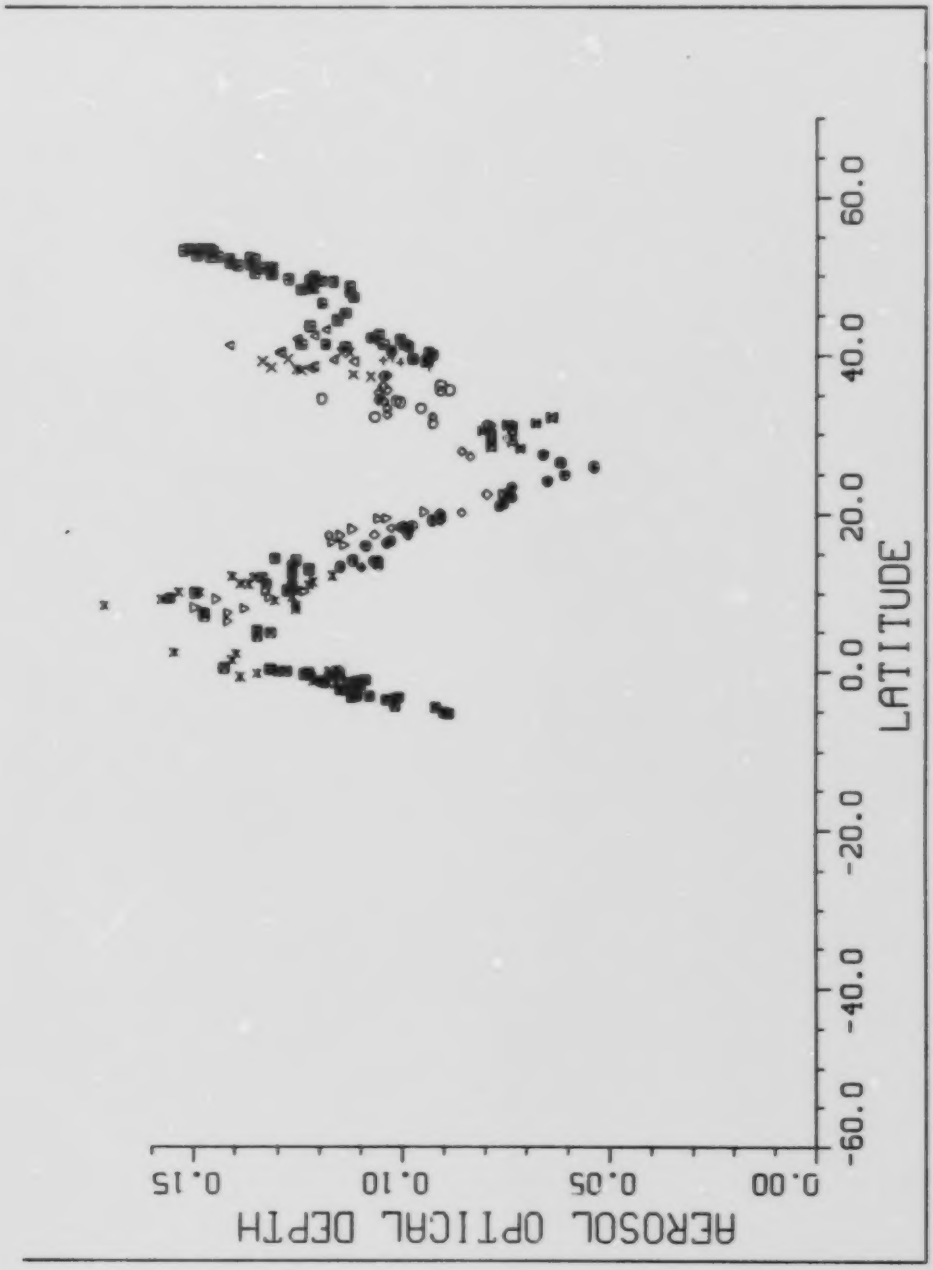

Figure B2.--Same as Fig. 1, but for 4-20 May 1983.

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Table B1.

AEROSOL OPTICAL DEPTH—NASA CV990 DEC. 1982
(TWO DEG. LATITUDE DAILY AVG.)

TAU, +- ERROR, (N)

DA	MO	YR	HR	LAT.	388NM	500NM	675NM	778NM
4	12	82	22	31	0.000 +-.000(0)	.093 +-.009(1)	.083 +-.009(1)	.080 +-.009(1)
4	12	82	22	33	0.000 +-.000(0)	.102 +-.043(2)	.088 +-.021(2)	.084 +-.009(2)
4	12	82	22	35	0.000 +-.000(0)	.101 +-.019(5)	.087 +-.021(5)	.080 +-.020(5)
4	12	82	23	37	0.000 +-.000(0)	.091 +-.007(1)	.074 +-.007(1)	.068 +-.007(1)
7	12	82	20	39	0.000 +-.000(0)	.119 +-.015(4)	.110 +-.011(4)	.106 +-.012(4)
7	12	82	20	41	0.000 +-.000(0)	.134 +-.021(3)	.122 +-.021(3)	.117 +-.018(3)
7	12	82	21	43	0.000 +-.000(0)	.122 +-.014(3)	.117 +-.011(3)	.113 +-.010(3)
8	12	82	0	39	0.000 +-.000(0)	.101 +-.007(4)	.092 +-.008(4)	.092 +-.007(4)
9	12	82	17	41	0.000 +-.000(0)	.114 +-.013(2)	.098 +-.016(2)	.098 +-.022(2)
9	12	82	17	39	0.000 +-.000(0)	.129 +-.011(5)	.119 +-.013(5)	.113 +-.014(5)
9	12	82	17	37	0.000 +-.000(0)	.107 +-.008(5)	.097 +-.008(5)	.094 +-.011(5)
13	12	82	15	35	0.000 +-.000(0)	.105 +-.006(4)	.097 +-.007(4)	.097 +-.006(4)
13	12	82	16	33	.094 +-.017(4)	.100 +-.017(3)	.090 +-.018(3)	.087 +-.022(3)
13	12	82	16	31	.076 +-.015(3)	.079 +-.008(3)	.067 +-.010(3)	.064 +-.013(3)
13	12	82	17	29	.066 +-.008(1)	.113 +-.246(2)	.061 +-.008(1)	.061 +-.044(2)
13	12	82	17	27	.074 +-.032(3)	.085 +-.017(2)	.076 +-.014(2)	.068 +-.017(2)
13	12	82	18	23	.055 +-.105(2)	.078 +-.030(2)	.059 +-.039(2)	.062 +-.048(2)
13	12	82	18	21	0.000 +-.000(0)	.088 +-.019(3)	.070 +-.016(3)	.065 +-.021(3)
13	12	82	19	19	.082 +-.026(5)	.099 +-.019(5)	.083 +-.021(5)	.091 +-.030(5)
13	12	82	19	17	.081 +-.030(2)	.113 +-.049(2)	.099 +-.021(2)	.096 +-.056(2)
14	12	82	21	11	.083 +-.013(1)	.124 +-.013(1)	.126 +-.013(1)	.124 +-.013(1)
14	12	82	21	9	.093 +-.018(3)	.141 +-.022(4)	.139 +-.016(4)	.138 +-.025(3)
14	12	82	21	7	.105 +-.028(2)	.142 +-.012(2)	.139 +-.028(2)	.136 +-.041(2)
14	12	82	22	11	.124 +-.010(1)	.133 +-.010(1)	.133 +-.010(1)	.128 +-.010(1)
14	12	82	22	17	.113 +-.010(3)	.115 +-.008(3)	.110 +-.007(3)	.108 +-.008(3)
14	12	82	23	19	.105 +-.011(3)	.107 +-.011(3)	.101 +-.012(3)	.099 +-.012(3)
14	12	82	23	21	.096 +-.004(1)	.095 +-.004(1)	.086 +-.004(1)	.090 +-.004(1)
14	12	82	23	23	.082 +-.002(1)	.076 +-.002(1)	.062 +-.002(1)	.060 +-.002(1)
16	12	82	14	1	.097 +-.015(8)	.118 +-.015(8)	.114 +-.015(8)	.110 +-.015(8)
16	12	82	14	-1	.085 +-.014(7)	.108 +-.015(7)	.104 +-.018(7)	.097 +-.015(7)
16	12	82	15	-3	.068 +-.016(4)	.093 +-.018(4)	.087 +-.018(4)	.085 +-.022(4)
16	12	82	15	-1	.085 +-.021(3)	.112 +-.015(3)	.110 +-.023(3)	.099 +-.017(3)
16	12	82	16	1	.099 +-.025(6)	.128 +-.022(6)	.126 +-.022(6)	.117 +-.025(6)
16	12	82	17	5	.101 +-.021(3)	.134 +-.019(3)	.127 +-.020(3)	.120 +-.018(3)
16	12	82	17	7	.117 +-.041(2)	.148 +-.016(2)	.140 +-.060(2)	.143 +-.016(1)
16	12	82	17	9	.129 +-.016(1)	.156 +-.016(1)	.141 +-.016(1)	.128 +-.016(1)
16	12	82	17	11	.094 +-.029(4)	.135 +-.029(4)	.141 +-.029(4)	.127 +-.029(4)
16	12	82	18	13	.089 +-.030(3)	.128 +-.021(4)	.126 +-.019(4)	.118 +-.020(4)
16	12	82	18	15	.102 +-.079(2)	.129 +-.032(2)	.134 +-.028(2)	.122 +-.028(2)
17	12	82	19	13	.108 +-.078(2)	.138 +-.031(2)	.143 +-.050(2)	.128 +-.034(2)

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Table B1 (continued).

AEROSOL OPTICAL DEPTH—NASA CV990 DEC. 1982
(TWO DEG. LATITUDE DAILY AVG.)

TAU, +- ERROR, (N)

DA	MO	YR	HR	LAT.	380NM	500NM	675NM	778NM
17	12	82	19	11	.114 +-.028(4)	.145 +-.025(4)	.145 +-.022(4)	.140 +-.023(4)
17	12	82	20	9	.129 +-.030(4)	.165 +-.027(4)	.166 +-.025(4)	.170 +-.026(4)
17	12	82	20	7	.187 +-.015(1)	.180 +-.023(3)	.194 +-.026(3)	.187 +-.054(3)
17	12	82	21	3	.114 +-.052(2)	.148 +-.061(2)	.144 +-.052(2)	.142 +-.014(2)
17	12	82	21	1	.098 +-.020(12)	.123 +-.017(13)	.122 +-.018(13)	.117 +-.018(13)
17	12	82	22	3	.177 +-.010(1)	.178 +-.010(1)	.181 +-.010(1)	.181 +-.010(1)
17	12	82	23	9	.129 +-.010(4)	.128 +-.009(4)	.126 +-.008(4)	.125 +-.008(4)
17	12	82	23	11	.122 +-.008(3)	.124 +-.008(3)	.122 +-.010(3)	.121 +-.007(3)
17	12	82	23	13	.099 +-.033(4)	.112 +-.014(4)	.113 +-.013(4)	.106 +-.017(4)
19	12	82	21	15	.073 +-.014(3)	.108 +-.017(3)	.113 +-.017(3)	.100 +-.017(3)
19	12	82	21	17	.080 +-.018(4)	.104 +-.015(4)	.105 +-.015(4)	.096 +-.014(4)
19	12	82	22	19	.082 +-.014(4)	.095 +-.014(4)	.095 +-.014(4)	.087 +-.014(4)
19	12	82	22	21	.067 +-.033(2)	.077 +-.011(2)	.071 +-.020(2)	.067 +-.014(2)
19	12	82	23	23	.071 +-.010(3)	.074 +-.008(3)	.067 +-.009(3)	.064 +-.010(3)
19	12	82	23	25	.066 +-.015(2)	.063 +-.018(2)	.056 +-.021(2)	.054 +-.015(2)
19	12	82	23	27	.061 +-.020(3)	.061 +-.015(3)	.055 +-.012(3)	.054 +-.013(3)
20	12	82	0	29	.076 +-.011(3)	.076 +-.007(4)	.071 +-.007(4)	.071 +-.007(4)
20	12	82	0	31	.081 +-.006(6)	.075 +-.006(6)	.071 +-.006(6)	.074 +-.005(6)
20	12	82	0	33	0.000 +-.000(0)	.064 +-.001(1)	.060 +-.001(1)	.046 +-.001(1)
4	1	83	19	41	0.000 +-.000(0)	.122 +-.028(2)	.115 +-.009(1)	.107 +-.009(1)
4	1	83	20	49	.102 +-.008(7)	.123 +-.007(7)	.110 +-.008(7)	.106 +-.008(7)
4	1	83	20	51	.119 +-.013(5)	.133 +-.012(5)	.121 +-.011(5)	.116 +-.010(5)
4	1	83	21	53	.143 +-.010(12)	.146 +-.008(12)	.132 +-.008(12)	.126 +-.008(12)
4	1	83	22	51	.130 +-.009(5)	.135 +-.009(5)	.119 +-.009(5)	.112 +-.008(5)
4	1	83	22	49	.112 +-.011(4)	.118 +-.010(5)	.105 +-.010(5)	.101 +-.009(5)
4	1	83	22	47	.112 +-.014(2)	.116 +-.030(2)	.102 +-.030(2)	.098 +-.017(2)
4	1	83	23	45	.114 +-.007(2)	.115 +-.010(2)	.103 +-.010(2)	.100 +-.007(2)
4	1	83	23	43	.107 +-.018(3)	.110 +-.023(3)	.093 +-.018(3)	.094 +-.016(3)
4	1	83	23	41	.109 +-.025(2)	.106 +-.015(3)	.092 +-.013(3)	.088 +-.007(3)
4	1	83	23	43	.113 +-.003(1)	.107 +-.009(2)	.098 +-.015(2)	.093 +-.003(1)
5	1	83	0	41	.100 +-.002(1)	.097 +-.006(5)	.084 +-.007(4)	.082 +-.003(4)

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Table B2.

AEROSOL OPTICAL DEPTH—NASA CV990 APR/MAY 1983
(TWO DEG. LATITUDE DAILY AVG.)

TAU. ← ERROR. (N)

DA	MO	YR	HR	LAT.	388NM	500NM	675NM	778NM	862NM
20	4	83	1	41	.107 ←.007(5)	.108 ←.007(5)	0.000 ←.000(0)	.114 ←.007(5)	.097 ←.008(5)
20	4	83	1	43	.105 ←.011(3)	.106 ←.008 3)	0.000 ←.000(0)	.109 ←.010(3)	.095 ←.008(3)
20	4	83	1	45	.113 ←.007(6)	.116 ←.008(6)	0.000 ←.000(0)	.118 ←.007(6)	.105 ←.007(6)
20	4	83	2	47	.113 ←.007(4)	.118 ←.006(4)	0.000 ←.000(0)	.117 ←.006(4)	.105 ←.006(4)
27	4	83	0	39	.103 ←.020(2)	.098 ←.027(2)	.092 ←.014(2)	.111 ←.014(2)	.082 ←.012(2)
27	4	83	0	41	.102 ←.011(3)	.098 ←.014(3)	.092 ←.014(3)	.107 ←.015(3)	.084 ←.012(3)
27	4	83	0	43	.104 ←.015(4)	.106 ←.015(4)	.099 ←.014(4)	.111 ←.014(4)	.090 ←.018(4)
27	4	83	0	45	.117 ←.031(4)	.119 ←.026(4)	.111 ←.031(4)	.126 ←.024(4)	.105 ←.024(4)
27	4	83	1	47	.127 ←.009(4)	.129 ←.009(4)	.126 ←.010(4)	.132 ←.012(4)	.113 ←.010(3)
4	5	83	20	35	.090 ←.030(6)	.079 ←.032(6)	.068 ←.032(6)	.100 ←.030(6)	.067 ←.029(6)
4	5	83	21	33	.063 ←.031(4)	.055 ←.029(4)	.045 ←.025(5)	.072 ←.032(5)	.043 ←.027(5)
4	5	83	23	31	.044 ←.009(3)	.038 ←.011(3)	.029 ←.012(3)	.047 ←.010(3)	.032 ←.011(3)
4	5	83	23	33	.054 ←.011(4)	.050 ←.011(4)	.042 ←.012(4)	.058 ←.011(4)	.044 ←.012(4)
4	5	83	23	35	.078 ←.019(4)	.075 ←.019(4)	.067 ←.016(4)	.080 ←.019(4)	.065 ←.018(4)
4	5	83	23	37	.117 ←.011(3)	.112 ←.014(3)	.102 ←.015(3)	.113 ←.013(3)	.100 ←.016(3)
5	5	83	0	39	.125 ←.022(2)	.121 ←.003(2)	.113 ←.004(3)	.121 ←.011(2)	.108 ←.008(2)
5	5	83	22	29	.037 ←.013(3)	.028 ←.016(3)	.020 ←.012(3)	.043 ←.013(3)	.018 ←.012(3)
5	5	83	22	31	.038 ←.012(6)	.030 ←.011(6)	.022 ←.011(6)	.045 ←.015(6)	.023 ←.013(6)
5	5	83	23	33	.046 ←.013(6)	.039 ←.013(6)	.032 ←.013(6)	.049 ←.013(6)	.035 ←.013(6)
5	5	83	23	35	.066 ←.012(7)	.061 ←.012(7)	.053 ←.011(7)	.069 ←.011(7)	.055 ←.010(7)
5	5	83	23	37	.091 ←.008(3)	.087 ←.005(3)	.080 ←.010(3)	.092 ←.010(3)	.080 ←.010(3)
5	5	83	23	39	.094 ←.009(5)	.091 ←.007(5)	.084 ←.007(5)	.095 ←.006(5)	.083 ←.007(5)
6	5	83	0	41	.110 ←.018(3)	.108 ←.015(3)	.104 ←.019(4)	.108 ←.013(3)	.097 ←.013(3)
7	5	83	14	39	.093 ←.006(8)	.089 ←.007(8)	.084 ←.007(8)	.091 ←.007(8)	.078 ←.007(8)
7	5	83	14	37	.087 ←.008(5)	.082 ←.007(5)	.077 ←.007(5)	.088 ←.008(5)	.074 ←.008(5)
9	5	83	14	71	.128 ←.014(3)	.125 ←.012(3)	.115 ←.006(4)	.115 ←.010(3)	.102 ←.012(3)
9	5	83	14	69	.123 ←.005(5)	.121 ←.005(5)	.113 ←.004(5)	.115 ←.005(5)	.101 ←.005(5)
9	5	83	15	67	.124 ←.006(5)	.120 ←.004(5)	.115 ←.006(5)	.117 ←.006(5)	.104 ←.005(5)
9	5	83	15	65	.123 ←.006(3)	.122 ←.008(3)	.109 ←.007(3)	.115 ←.005(3)	.106 ←.016(3)
9	5	83	15	63	.130 ←.010(5)	.125 ←.013(5)	.116 ←.008(5)	.122 ←.011(5)	.104 ←.007(5)
9	5	83	15	61	.144 ←.029(2)	.137 ←.026(2)	.121 ←.012(2)	.129 ←.005(1)	.109 ←.005(1)
11	5	83	15	59	.125 ←.019(2)	.122 ←.009(2)	.119 ←.012(2)	.121 ←.004(2)	.108 ←.007(2)
11	5	83	15	57	.125 ←.005(6)	.125 ←.005(6)	.123 ←.004(6)	.125 ←.004(6)	.111 ←.005(6)
11	5	83	15	55	.130 ←.006(6)	.130 ←.005(6)	.127 ←.005(6)	.130 ←.005(6)	.114 ←.005(6)
11	5	83	16	53	.133 ←.006(4)	.132 ←.006(4)	.129 ←.005(4)	.134 ←.006(4)	.117 ←.006(4)
11	5	83	16	51	.132 ←.008(4)	.131 ←.007(4)	.128 ←.007(4)	.133 ←.007(4)	.115 ←.008(4)
11	5	83	16	49	.133 ←.021(2)	.133 ←.028(2)	.131 ←.014(2)	.135 ←.014(2)	.114 ←.014(2)
11	5	83	16	47	.115 ←.021(4)	.114 ←.019(4)	.112 ←.021(4)	.116 ←.021(4)	.095 ←.019(4)
11	5	83	17	45	.108 ←.013(4)	.105 ←.012(4)	.099 ←.010(4)	.111 ←.012(4)	.090 ←.011(4)
11	5	83	17	39	.083 ←.016(3)	.079 ←.012(3)	.069 ←.014(3)	.084 ←.012(3)	.059 ←.021(3)
11	5	83	18	37	.079 ←.919(2)	.075 ←.012(2)	.066 ←.013(2)	.085 ←.012(2)	.055 ←.026(2)
11	5	83	18	35	.076 ←.015(4)	.073 ←.015(4)	.063 ←.013(4)	.083 ←.014(4)	.056 ←.014(4)
11	5	83	18	37	.068 ←.051(2)	.067 ←.032(2)	.056 ←.020(2)	.075 ←.018(2)	.050 ←.044(2)
11	5	83	18	33	.062 ←.019(2)	.057 ←.027(2)	.049 ←.022(2)	.070 ←.038(2)	.046 ←.019(2)
11	5	83	18	31	.062 ←.015(3)	.056 ←.020(3)	.044 ←.019(3)	.071 ←.022(3)	.044 ←.028(3)
11	5	83	19	29	.067 ←.017(5)	.062 ←.017(5)	.050 ←.018(5)	.076 ←.016(5)	.048 ←.018(5)
11	5	83	19	27	.075 ←.020(5)	.069 ←.020(5)	.055 ←.017(5)	.085 ←.020(5)	.057 ←.019(5)
11	5	83	19	25	.093 ←.026(3)	.076 ←.020(3)	.061 ←.024(3)	.092 ←.023(3)	.062 ←.022(3)
11	5	83	20	23	.093 ←.030(2)	.072 ←.024(2)	.062 ←.023(2)	.092 ←.032(2)	.055 ←.028(2)
12	5	83	17	1	.065 ←.006(6)	.064 ←.006(6)	.063 ←.006(6)	.071 ←.005(6)	.060 ←.006(6)
12	5	83	18	-1	.063 ←.005(1)	.063 ←.005(1)	.072 ←.005(1)	.079 ←.005(1)	.071 ←.005(1)
12	5	83	19	-5	.044 ←.011(3)	.042 ←.013(3)	.035 ←.011(3)	.049 ←.022(3)	.032 ←.010(3)
12	5	83	19	-7	.049 ←.016(2)	.043 ←.015(2)	.033 ←.013(3)	.051 ←.015(2)	.030 ←.010(2)

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Table B2 (continued).
AEROSOL OPTICAL DEPTH—NASA CV990 APR/MAY 1983
(TWO DEG. LATITUDE DAILY AVG.)

TAU, +- ERROR, (N)

DA	MO	YR	HR	LAT.	388NM	500NM	675NM	778NM	862NM
12	5	83	19	-9	.043 +-.012(7)	.039 +-.011(7)	.030 +-.012(7)	.052 +-.012(7)	.033 +-.011(7)
12	5	83	19	-11	.040 +-.011(2)	.037 +-.011(2)	.026 +-.015(2)	.052 +-.024(2)	.033 +-.021(2)
17	5	83	1	-45	.069 +-.009(6)	.059 +-.009(6)	.045 +-.010(7)	.057 +-.010(6)	.034 +-.009(6)
17	5	83	1	-47	.068 +-.009(6)	.059 +-.008(6)	.045 +-.009(7)	.053 +-.009(6)	.032 +-.009(6)
17	5	83	1	-49	.063 +-.007(1)	.055 +-.007(1)	.050 +-.007(1)	.050 +-.007(1)	.031 +-.007(1)
17	5	83	1	-47	.066 +-.008(5)	.058 +-.007(5)	.044 +-.009(6)	.053 +-.009(5)	.035 +-.008(5)
17	5	83	2	-51	.071 +-.009(5)	.061 +-.009(5)	.044 +-.008(5)	.050 +-.008(5)	.035 +-.007(5)
17	5	83	2	-53	.053 +-.005(10)	.054 +-.005(10)	.040 +-.005(10)	.046 +-.005(10)	.035 +-.006(10)
18	5	83	0	-35	.090 +-.017(5)	.083 +-.016(5)	.069 +-.016(5)	.083 +-.015(5)	.070 +-.016(5)
18	5	83	0	-33	.084 +-.019(3)	.069 +-.023(3)	.055 +-.019(3)	.074 +-.019(3)	.056 +-.018(3)
18	5	83	1	-31	.049 +-.019(2)	.049 +-.043(2)	.038 +-.037(2)	.055 +-.027(2)	.039 +-.013(2)
18	5	83	1	-29	.046 +-.016(5)	.041 +-.016(5)	.031 +-.017(5)	.051 +-.015(5)	.043 +-.016(5)
18	5	83	1	-27	.052 +-.016(3)	.041 +-.014(3)	.031 +-.018(3)	.052 +-.018(3)	.046 +-.017(3)
18	5	83	1	-25	.049 +-.018(2)	.042 +-.029(2)	.030 +-.025(2)	.051 +-.027(2)	.040 +-.024(2)
18	5	83	1	-23	.038 +-.026(3)	.031 +-.022(3)	.022 +-.021(4)	.041 +-.050(2)	.033 +-.023(3)
18	5	83	2	-21	0.000 +-.000(0)	0.000 +-.000(0)	.016 +-.011(1)	0.000 +-.000(0)	0.000 +-.000(0)
18	5	83	3	-17	.041 +-.015(5)	.030 +-.012(5)	.020 +-.012(6)	.040 +-.011(5)	.029 +-.015(5)
18	5	83	3	-15	.036 +-.018(2)	.029 +-.021(2)	.020 +-.012(2)	.039 +-.008(2)	.030 +-.018(2)
18	5	83	3	-13	.047 +-.006(1)	.042 +-.038(2)	.031 +-.045(2)	.043 +-.006(1)	.050 +-.006(1)
19	5	83	0	-7	.034 +-.018(3)	.029 +-.020(3)	.022 +-.017(3)	.051 +-.025(3)	.051 +-.022(3)
19	5	83	0	-5	.044 +-.016(1)	.037 +-.016(1)	.029 +-.016(1)	.056 +-.016(1)	.058 +-.016(1)
19	5	83	1	-3	.050 +-.019(5)	.046 +-.020(5)	.044 +-.018(5)	.069 +-.018(5)	.069 +-.019(5)
19	5	83	1	-1	.054 +-.018(3)	.050 +-.020(3)	.045 +-.019(3)	.072 +-.016(3)	.069 +-.017(3)
19	5	83	1	1	.055 +-.020(5)	.054 +-.017(5)	.053 +-.017(6)	.074 +-.015(5)	.074 +-.015(5)
19	5	83	2	3	.057 +-.014(5)	.055 +-.013(5)	.054 +-.014(5)	.077 +-.014(5)	.076 +-.014(5)
19	5	83	2	5	.058 +-.016(2)	.054 +-.013(2)	.054 +-.015(2)	.072 +-.016(2)	.074 +-.013(2)
19	5	83	2	7	.055 +-.010(1)	.055 +-.010(1)	.055 +-.010(1)	.074 +-.010(1)	.071 +-.010(1)
19	5	83	3	15	.065 +-.006(4)	.063 +-.007(4)	.057 +-.006(4)	.069 +-.006(4)	.067 +-.006(4)
19	5	83	4	17	.070 +-.006(6)	.067 +-.005(6)	.062 +-.006(6)	.072 +-.005(6)	.070 +-.005(6)
19	5	83	4	19	.075 +-.003(1)	.072 +-.003(1)	.067 +-.003(1)	.075 +-.003(1)	.074 +-.003(1)
20	5	83	22	23	.034 +-.028(3)	.031 +-.029(3)	.031 +-.024(3)	.059 +-.025(3)	.059 +-.020(2)
20	5	83	23	25	.042 +-.019(1)	.040 +-.019(1)	.038 +-.019(1)	.060 +-.019(1)	.069 +-.019(1)
20	5	83	23	27	.049 +-.039(3)	.040 +-.029(3)	.042 +-.031(4)	.063 +-.038(3)	.066 +-.034(3)
21	5	83	0	29	.074 +-.016(12)	.072 +-.016(12)	.063 +-.016(12)	.082 +-.017(12)	.087 +-.016(12)
21	5	83	0	31	.082 +-.015(10)	.078 +-.014(10)	.074 +-.014(11)	.089 +-.014(10)	.090 +-.012(10)
21	5	83	1	33	.081 +-.007(6)	.079 +-.007(6)	.071 +-.007(6)	.079 +-.006(6)	.077 +-.006(6)

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Appendix C: Summaries of Ratios of Global Diffuse-Sky to Global Total Irradiance, and Albedo Values

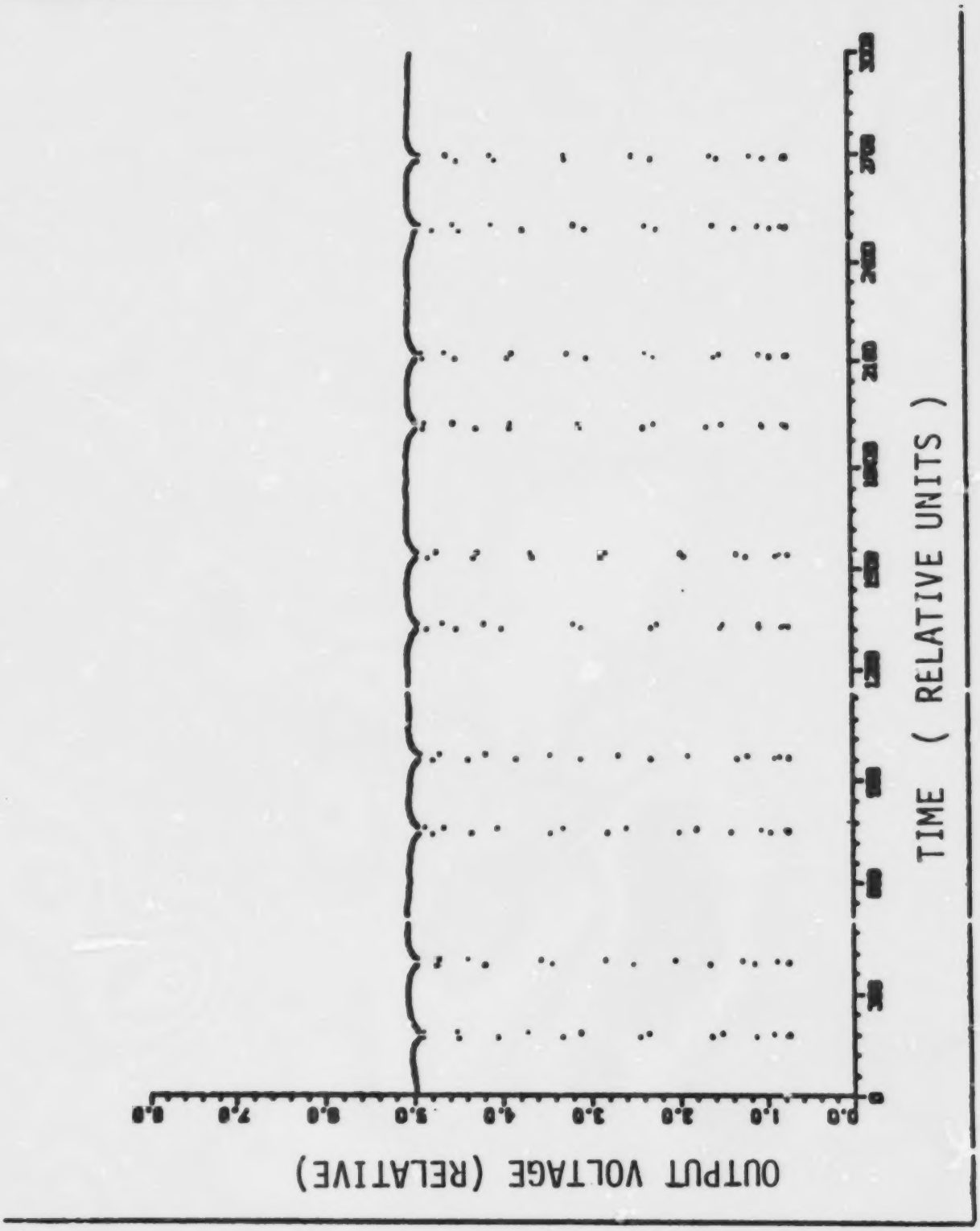

Figure C1.--Signal traces from the aircraft diffuse-to-total ratioing radiometer under clear skies. Downward spikes correspond to shadow bands shading the sensor.

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Table C1.

DIFFUSE TO TOTAL RATIOS FROM CV990 DEC 1982 -- PH SENSOR (400NM--700NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
341	43	22.6	.213	******	.317	******	1	28853.	-127
343	41	15.7		******	.296	******	1	36849.	-105
347	28	31.1	.421	.130	.145	.010	4	36828.	-115
347	27	33.6	.230	.061	.132	.007	6	36825.	-114
347	26	37.4	.215	******	.136	******	1	36812.	-111
347	25	38.8	.219	******	.139	******	1	36818.	-111
347	22	43.4	.500	******	.124	******	1	36822.	-109
347	21	45.5	.418	******	.125	******	1	36813.	-107
347	20	46.4	.856	.055	.133	.005	5	36802.	-106
347	19	47.3	.884	.020	.137	.006	5	36815.	-105
347	18	47.6	.689	.163	.138	.004	6	36899.	-104
348	12	42.1	.181	.061	.281	.028	2	32837.	-99
348	11	41.7	.144	.008	.204	.008	2	34839.	-99
348	10	40.9	.173	.017	.215	.028	4	34824.	-99
348	9	40.1	.365	.089	.204	.002	7	34842.	-99
348	8	39.4	.372	.203	.212	.007	7	34827.	-99
348	7	38.6	.275	.140	.215	.003	6	34831.	-100
348	6	37.7	.295	.112	.237	.059	5	34848.	-99
350	0	26.4	.191	******	.213	******	1	36707.	-102
350	-1	28.9	.265	******	.217	******	1	36687.	-103
350	-2	30.4	.439	.080	.203	.020	4	36700.	-103
350	-3	32.9	.257	******	.175	******	1	36697.	-104
350	-4	34.8	.171	******	.159	******	1	36701.	-105
350	-5	36.6	.212	.034	.153	.009	5	36707.	-105
350	-4	40.4	.167	******	.158	******	1	36709.	-105
350	-3	41.4	.376	.084	.166	.008	7	36700.	-105
350	-2	43.1	.323	.028	.171	.010	7	36795.	-104
350	-1	44.6	.526	.045	.175	.006	3	36705.	-104
350	0	46.7	.370	.237	.179	.007	17	36689.	-104
350	1	48.8	.116	.010	.159	.009	9	36695.	-103
350	2	49.5	.122	******	.194	******	1	36690.	-103
350	4	51.7	.769	.046	.179	.002	7	38755.	-102
350	5	52.4	.818	.024	.186	.006	7	38790.	-102
350	7	53.4	.443	.124	.175	.004	12	38793.	-102
350	8	53.7	.184	.088	.156	.006	13	38780.	-102
350	9	53.8	.132	.025	.146	.004	15	38769.	-101
350	10	53.8	.168	.035	.149	.005	16	38769.	-101
350	11	53.6	.106	.015	.153	.003	15	38782.	-101
350	12	53.3	.094	.001	.154	.004	10	38784.	-100
350	13	51.4	.092	.043	.169	.036	7	38771.	-100
351	12	49.7	.123	.023	.162	.002	2	32867.	-99
351	11	49.7	.126	.030	.166	.003	4	32868.	-99
351	9	49.2	.163	.005	.167	.004	5	32856.	-100
351	8	48.8	.165	******	.183	******	1	32870.	-100
351	7	48.6	.187	******	.182	******	1	32873.	-100
351	5	47.3	.224	******	.351	******	1	34843.	-100
351	2	44.7	.186	******	.201	******	1	34848.	-100
351	0	41.3	.214	.005	.168	.008	3	35842.	-100
351	-1	40.6	.305	******	.170	******	1	35842.	-100
351	4	25.9	.568	******	.351	******	1	38300.	-103
353	15	41.9	.130	.003	.196	.007	6	27463.	-101
353	14	41.3	.126	.010	.182	.005	8	30795.	-102
353	13	40.8	.124	.003	.194	.005	6	30935.	-103
353	12	40.0	.158	.022	244	.020	8	32085.	-104
353	13	38.1	.156	.012	.197	.020	8	32863.	-105
353	14	35.9	.177	.017	.200	.031	3	32865.	-106
353	16	31.9	.145	******	.178	******	1	34703.	-108
353	17	29.9	.154	.002	.210	.019	3	34701.	-108
353	18	28.7	.157	******	.214	******	1	34711.	-109
353	19	26.6	.169	******	.189	******	1	34684.	-109
4	41	24.7	.454	******	.308	******	1	34953.	-121

DOY -- day of year

LAT -- latitude band

SO.EL. -- solar elevation

ALBE. -- average albedo

AL.SD. -- albedo std. dev.

DI/TO -- ratio of diffuse to total

DT.SD. -- DI/TO std. dev.

N -- number of observations

PALT -- pressure altitude

LONG -- longitude

Table C2.

DIFFUSE TO TOTAL RATIOS FROM CV990 DEC 1982 -- IR SENSOR (780NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
341	43	22.4	.049	.053	.249	.006	3	28033.	-127
343	39	20.9	.446	.010	.240	.016	3	38821.	-116
343	38	22.5	.495	******	.221	******	1	38820.	-119
343	37	23.4	.249	******	.184	******	1	38816.	-120
347	32	17.5	.469	******	.205	******	1	34873.	-116
347	31	19.6	.675	.030	.168	.020	10	34873.	-117
347	30	21.4	.579	.091	.136	.011	3	34856.	-110
347	28	30.8	.432	.012	.126	.006	3	36828.	-115
347	27	33.5	.165	.014	.105	.005	6	36826.	-114
347	21	45.5	.344	******	.080	******	1	36813.	-107
347	20	46.5	.789	******	.085	******	1	36820.	-106
347	19	47.3	.784	.023	.087	.006	6	36830.	-105
347	18	47.6	.673	.010	.099	.002	2	36809.	-103
348	12	42.0	.169	.009	.281	.016	3	32877.	-99
348	11	41.6	.089	.039	.187	.008	4	34859.	-99
348	10	40.8	.116	.005	.181	.006	5	34843.	-99
348	9	40.1	.322	.089	.180	.003	8	34842.	-99
348	8	39.3	.354	.190	.185	.004	6	34827.	-99
348	7	38.7	.272	.166	.182	.006	5	34831.	-100
348	6	37.5	.203	.077	.220	.045	8	34838.	-99
348	7	35.8	.233	******	.236	******	1	34858.	-100
348	9	31.0	.356	.106	.220	.001	2	35857.	-101
348	11	27.1	.570	******	.292	******	1	36811.	-102
348	15	19.8	.541	******	.257	******	1	36813.	-104
350	0	25.8	.132	.054	.197	.021	13	36710.	-102
350	-1	28.2	.369	.140	.176	.007	10	36698.	-103
350	-2	30.1	.370	.030	.181	.021	6	36706.	-103
350	-3	31.9	.275	.086	.147	.006	5	36709.	-104
350	-4	33.7	.139	.022	.143	.012	3	36696.	-104
350	-5	36.2	.147	.051	.118	.007	9	36705.	-105
350	-4	39.3	.124	.017	.121	.002	2	36726.	-105
350	-3	41.0	.292	.112	.131	.002	4	36700.	-105
350	-2	43.4	.265	.034	.136	.006	2	36698.	-104
350	-1	44.5	.432	.005	.136	.004	4	36704.	-104
350	0	46.3	.381	.267	.140	.003	9	36705.	-104
350	1	48.6	.060	.009	.141	.010	2	36702.	-103
350	2	49.6	.165	.196	.181	.020	4	36711.	-103
350	3	50.9	.481	******	.164	******	1	38774.	-103
350	4	51.7	.695	.046	.147	.002	6	38755.	-102
350	5	52.5	.719	******	.148	******	1	38770.	-102
350	6	53.2	.631	******	.143	******	1	38799.	-102
350	7	53.4	.364	.118	.151	.003	9	38786.	-102
350	9	53.8	.088	.019	.134	.001	3	38763.	-101
350	10	53.8	.093	.027	.135	.003	5	38764.	-101
350	11	53.6	.044	.002	.130	.000	2	38775.	-101
351	11	49.6	.080	.031	.146	.002	4	32868.	-99
351	10	49.6	.147	******	.141	******	1	32869.	-99
351	9	49.2	.104	.005	.151	.003	3	32856.	-100
351	8	48.7	.096	******	.156	******	1	32872.	-100
351	7	48.4	.142	.031	.167	.010	3	32873.	-100
351	0	41.4	.142	.023	.143	.003	5	35845.	-100
351	-1	40.0	.249	.018	.150	.009	2	35836.	-100
353	12	39.6	.104	.001	.211	.010	2	32847.	-105
353	13	38.0	.083	.016	.170	.019	4	32863.	-105
353	14	35.9	.104	.014	.174	.021	3	32866.	-106
353	15	34.7	.080	.011	.203	.044	4	33387.	-107
353	16	31.9	.077	.004	.173	.015	3	34701.	-107
353	17	30.0	.077	.001	.163	.007	10	34731.	-108
353	18	28.5	.079	.001	.162	.009	8	34687.	-109
353	19	26.1	.089	.003	.162	.007	4	34717.	-109
353	20	24.2	.096	.004	.152	.008	4	34756.	-110

Table C3.

DIFFUSE TO TOTAL RATIOS FROM CV990 DEC 1982 -- PY SENSOR (350NM--1100NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
341	38	29.1	.175	.004	.238	.028	4	14834.	-122
341	40	26.7	.161	******	.196	******	1	28850.	-124
341	42	23.6	.080	.044	.233	.005	5	28853.	-125
341	43	22.5	.069	.056	.275	.051	9	28858.	-126
341	44	21.7	.426	.017	.295	.020	2	26841.	-130
343	41	15.7	.592	******	.314	******	1	36850.	-105
343	40	18.2	.408	.253	.242	.016	13	38809.	-110
343	38	22.1	.310	.188	.240	.005	2	38814.	-118
343	37	23.8	.188	.032	.191	.007	4	38817.	-120
347	33	15.5	.211	******	.263	******	1	34863.	-115
347	30	21.7	.513	.079	.165	.012	10	34856.	-118
347	29	24.6	.477	.100	.165	.031	2	34864.	-119
347	27	33.1	.197	.037	.126	.005	8	36824.	-114
347	25	38.9	.187	.003	.103	.006	3	36812.	-111
347	24	40.8	.174	******	.083	******	1	36832.	-110
347	28	46.5	.801	.032	.092	.001	4	36812.	-106
347	19	47.1	.768	.011	.102	.004	4	36820.	-105
347	18	47.6	.669	.017	.104	.005	5	36814.	-104
348	13	42.3	.389	******	.344	******	1	32885.	-99
348	12	42.1	.132	.050	.278	.031	6	32886.	-99
348	11	41.5	.118	.045	.201	.053	10	34841.	-99
348	10	40.8	.125	.007	.181	.004	8	34852.	-99
348	9	40.1	.283	.087	.180	.002	11	34846.	-99
348	8	39.4	.295	.177	.183	.005	8	34849.	-100
348	7	38.6	.173	.097	.187	.004	9	34838.	-99
348	6	37.5	.205	.081	.236	.059	13	34846.	-99
348	7	36.0	.197	.039	.242	.021	2	34846.	-100
348	8	33.4	.281	.034	.199	.013	2	35864.	-101
348	11	27.1	.530	******	.304	******	1	36811.	-102
348	13	24.1	.661	.242	.458	.024	2	36811.	-103
348	14	21.1	.532	******	.388	******	1	36805.	-104
350	1	22.5	.116	.013	.280	.075	3	36692.	-101
350	0	25.4	.125	.031	.235	.024	30	36693.	-102
350	-1	28.4	.295	.154	.195	.008	12	36695.	-103
350	-2	30.1	.275	.068	.192	.025	11	36670.	-103
350	-3	32.5	.252	.070	.156	.005	8	36712.	-104
350	-4	33.8	.124	.026	.146	.011	11	36720.	-104
350	-5	36.6	.142	.037	.135	.006	13	36701.	-105
350	-4	39.8	.121	.019	.135	.006	7	36704.	-105
350	-3	41.4	.277	.053	.149	.006	15	36701.	-105
350	-2	42.9	.212	.009	.154	.011	5	36704.	-104
350	-1	44.7	.406	.025	.145	.002	7	36704.	-104
350	0	46.4	.304	.201	.150	.005	24	36683.	-104
350	1	48.6	.062	.009	.147	.003	10	36696.	-103
350	2	49.7	.193	.198	.211	.035	6	36704.	-103
350	3	50.7	.370	.051	.187	.014	4	38767.	-103
350	4	51.7	.654	.064	.154	.005	11	38763.	-102
350	5	52.3	.686	.033	.166	.038	10	38781.	-102
350	6	53.2	.582	******	.152	******	1	38795.	-102
350	7	53.4	.396	.107	.156	.003	6	38787.	-102
350	8	53.7	.085	.029	.140	.002	6	38773.	-101
350	9	53.8	.078	.020	.133	.002	12	38778.	-101
350	10	53.8	.106	.026	.129	.005	11	38777.	-101
350	11	53.6	.055	.013	.121	.001	10	38781.	-101
350	12	53.3	.045	.001	.126	.003	6	38796.	-100
350	13	50.3	.054	.034	.145	.026	9	38759.	-100
351	12	49.7	.082	.005	.129	.004	3	32860.	-99
351	11	49.7	.075	.019	.138	.003	10	32871.	-99
351	10	49.5	.131	.018	.147	.004	6	32866.	-99
351	9	49.2	.105	.003	.144	.004	6	32874.	-100
351	8	48.9	.090	.039	.158	.005	5	32878.	-100

Table C3 (continued).

351	5	47.4	.146	.003	.348	.024	2	34843.	-100
351	3	45.2	.217	.116	.168	.002	2	34844.	-100
351	2	44.6	.100	.014	.167	.001	3	34855.	-100
351	1	43.4	.378	******	.163	******	1	34852.	-100
351	0	41.4	.128	.013	.158	.005	5	35848.	-100
351	-1	39.7	.187	******	.176	******	1	35835.	-100
351	1	32.1	.220	******	.212	******	1	36806.	-101
351	2	30.0	.096	.003	.270	.005	2	36786.	-102
351	4	25.9	.406	******	.358	******	1	38303.	-103
353	15	41.9	.073	.005	.257	.225	5	27187.	-101
353	14	41.5	.073	.009	.158	.005	17	30802.	-102
353	13	40.8	.065	.009	.160	.007	14	30796.	-103
353	12	39.8	.098	.015	.212	.033	8	32130.	-104
353	13	38.2	.087	.009	.194	.012	13	32862.	-105
353	14	36.1	.101	.009	.182	.007	5	32864.	-106
353	15	35.1	.089	******	.181	******	1	33390.	-107
353	16	31.7	.079	.002	.173	.014	5	34700.	-108
353	17	30.0	.082	.001	.184	.004	10	34710.	-108
353	18	28.2	.086	.003	.186	.008	8	34707.	-109
353	19	26.0	.093	.002	.190	.004	14	34715.	-109
353	20	24.2	.101	.004	.174	.015	13	34754.	-110
353	21	21.7	.109	.004	.159	.003	3	34858.	-111
353	24	16.5	.152	******	.171	******	1	36821.	-114
4	41	24.9	.320	.073	.292	.057	17	34932.	-120

Table C4.

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — PH SENSOR (400NM—700NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
116	38	33.6	.319	.149	.230	.062	22	24210.	-121
117	39	32.0	.411	.085	.215	.009	12	35011.	-123
117	40	30.6	.473	.129	.221	.009	12	35020.	-123
117	41	29.2	.452	.095	.219	.014	16	34988.	-123
117	42	27.7	.501	.072	.223	.012	14	34985.	-123
117	43	26.3	.311	.114	.230	.010	15	35016.	-123
117	44	24.9	.272	.027	.237	.017	16	34984.	-123
117	45	23.5	.285	.031	.276	.014	16	34983.	-123
117	46	22.2	.241	.016	.296	.008	16	34976.	-124
117	47	20.9	.220	.026	.292	.013	10	35014.	-124
124	36	67.4	.373	.131	.172	.004	8	18960.	-120
124	35	66.5	.369	.134	.147	.012	12	18952.	-120
124	34	64.1	.166	.013	.108	.007	22	31054.	-118
124	33	60.0	.184	.019	.096	.007	24	32986.	-115
124	32	53.4	.159	.015	.085	.002	37	32981.	-112
124	31	44.1	.220	.069	.094	.007	55	32997.	-108
124	30	31.3	.170	.019	.158	.041	55	33000.	-103
124	31	21.5	.192	.016	.145	.008	13	37011.	-95
124	32	19.4	.190	.006	.164	.009	18	36988.	-95
124	33	17.3	.202	.006	.189	.016	16	37001.	-94
124	34	15.5	.210	.005	.231	.012	16	37003.	-94
124	35	13.5	.256	.022	.268	.018	14	36995.	-93
125	28	35.6	.090	.059	.104	.003	4	28699.	-95
125	27	33.3	.133	.005	.118	.016	21	30138.	-95
125	28	31.5	.153	.012	.119	.007	24	33015.	-95
125	29	29.2	.145	.002	.116	.005	16	33013.	-96
125	30	27.1	.156	.003	.117	.009	15	33010.	-96
125	31	25.2	.171	.010	.131	.014	15	33022.	-96
125	32	23.1	.182	.007	.140	.012	17	33036.	-95
125	33	21.0	.193	.004	.176	.023	16	33000.	-95
125	34	19.2	.195	.007	.191	.027	13	33024.	-94
125	35	17.3	.214	.007	.231	.017	14	33005.	-94
125	36	15.5	.211	.011	.274	.025	16	33023.	-94
125	37	13.5	.327	.141	.314	.017	8	35531.	-93
125	38	14.1	.344	.106	.295	.032	20	37003.	-93
127	37	16.2	.289	.057	.268	.028	18	36982.	-121
127	36	17.1	.545	******	.281	******	1	36994.	-120
129	65	11.2	.265	.019	.387	.026	5	36992.	-152
129	64	11.8	.251	.007	.382	.015	12	36990.	-152
129	63	12.7	.378	.181	.367	.023	10	37003.	-151
129	62	13.8	.786	.107	.356	.016	16	36996.	-151
129	61	14.9	.322	.108	.341	.017	15	36986.	-150
129	60	15.5	.397	******	.329	******	1	36967.	-149
131	55	11.5	.765	******	.450	******	1	33021.	-156
131	54	12.1	.717	.043	.445	.023	7	33043.	-156
131	53	13.5	.628	.049	.428	.014	8	33037.	-156
131	52	14.3	.515	.034	.401	.016	6	33018.	-155
131	51	15.6	.644	.048	.384	.021	9	33023.	-155
131	50	16.6	.747	.052	.391	.022	8	33024.	-155
131	49	17.9	.534	.039	.367	.015	6	33019.	-154
131	48	19.6	.621	.027	.325	.005	2	33018.	-154
131	47	20.7	.453	.080	.302	.019	11	33041.	-153
131	46	21.9	.391	.100	.274	.020	9	33057.	-153
131	45	23.3	.322	.045	.257	.015	12	33035.	-153
131	44	24.6	.315	.046	.256	.018	10	33036.	-152
131	43	26.2	.425	.066	.253	.022	14	33033.	-152
131	42	27.6	.483	.055	.272	.039	11	33016.	-152
131	41	29.0	.466	.086	.244	.023	12	33033.	-151
131	40	30.5	.627	.069	.259	.041	15	33050.	-151
131	39	31.9	.652	.029	.195	.026	12	33033.	-151

Table C4 (continued).

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — PH SENSOR (400NM—700NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
131	38	33.5	.680	.023	.175	.013	10	35905.	-151
131	37	35.0	.624	.039	.169	.017	14	36981.	-151
131	36	36.6	.571	.042	.160	.018	14	37004.	-151
131	35	38.3	.491	.102	.157	.019	15	37003.	-151
131	36	41.3	.635	.047	.128	.024	8	37025.	-151
131	33	42.9	.521	.015	.125	.000	2	36979.	-151
131	32	44.1	.199	.069	.150	.031	4	37066.	-151
131	31	45.5	.234	******	.143	******	1	36953.	-151
131	30	46.2	.210	.085	.096	.007	3	36993.	-151
131	29	48.1	.509	.058	.100	.005	9	36985.	-152
131	28	49.4	.418	.067	.101	.004	9	36960.	-153
131	27	51.0	.170	.082	.101	.003	6	36955.	-154
131	26	52.7	.164	.034	.103	.004	13	36948.	-154
131	25	54.2	.252	.060	.101	.005	7	36971.	-155
131	24	56.0	.123	.042	.102	.004	10	36952.	-156
131	23	57.7	.089	.002	.097	.003	6	36960.	-156
131	22	59.0	.085	.001	.090	.008	4	36985.	-156
132	0	11.6	.286	.005	.334	.021	10	35027.	-170
132	-1	13.2	.269	.014	.291	.025	14	35016.	-170
132	-2	15.4	.384	.052	.281	.018	17	35025.	-169
132	-3	17.3	.308	.064	.294	.024	15	35014.	-169
132	-4	19.2	.222	.017	.304	.048	17	35018.	-169
132	-5	21.0	.209	.016	.274	.069	16	35010.	-168
132	-6	22.9	.250	.046	.253	.039	17	34982.	-168
132	-7	24.9	.246	.059	.191	.045	12	35490.	-168
132	-8	26.5	.391	.074	.313	.131	8	36984.	-167
132	-9	27.7	.324	.081	.257	.102	7	36981.	-167
132	-10	28.7	.164	.013	.230	.069	6	36978.	-168
137	-44	26.1	.743	.054	.393	.166	3	28317.	171
137	-45	25.4	.585	.095	.255	.043	4	30223.	170
137	-46	24.0	.844	.070	.222	.027	9	33026.	169
137	-47	23.1	.772	.102	.216	.022	14	33001.	169
137	-48	22.0	.547	.056	.217	.027	20	33008.	167
137	-49	21.0	.401	.087	.204	.027	17	32993.	166
137	-50	20.2	.395	.074	.209	.013	4	32989.	165
137	-49	19.6	.532	.142	.212	.027	32	33031.	165
137	-50	18.0	.810	.043	.261	.024	10	32940.	169
137	-51	16.8	.503	.087	.247	.022	13	33032.	169
137	-52	15.7	.439	.071	.245	.030	7	33010.	168
137	-53	14.4	.649	.112	.274	.012	3	33004.	168
137	-54	13.0	.622	******	.291	******	1	33036.	167
137	-41	28.9	.738	******	.269	******	1	31035.	173
137	-40	30.0	.368	.006	.197	.054	2	33026.	173
138	-39	31.0	.263	******	.135	******	1	32979.	173
138	-38	32.0	.190	******	.133	******	1	32989.	174
138	-36	34.5	.291	.054	.151	.046	2	33022.	174
138	-35	35.0	.188	.044	.115	.004	6	33011.	174
138	-34	35.8	.168	.013	.109	.005	4	33217.	175
138	-33	36.5	.237	.052	.106	.009	6	34981.	175
138	-32	36.8	.434	.138	.107	.009	4	35023.	175
138	-31	37.3	.508	.067	.102	.006	6	35022.	175
138	-30	37.5	.605	.175	.097	.006	4	35007.	176
138	-29	37.8	.501	.300	.091	.006	7	34984.	176
138	-28	37.9	.195	.079	.080	.003	4	35038.	176
138	-27	37.9	.269	.041	.085	.007	4	35016.	176
138	-26	37.9	.157	.029	.085	.002	4	35016.	176
138	-25	37.7	.140	.009	.084	.010	6	35005.	176
138	-24	36.3	.259	.103	.105	.039	17	36571.	176
138	-23	34.5	.147	.015	.156	.081	18	36982.	178

Table C4 (continued).

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — PH SENSOR (400NM—700NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
138	-22	32.5	.140	.025	.213	.135	16	36968.	-179
138	-21	30.5	.177	.029	.247	.081	20	36969.	-178
138	-20	28.4	.204	.050	.243	.111	18	36963.	-177
138	-19	26.4	.232	.042	.117	.018	16	36964.	-176
138	-18	24.5	.404	.107	.126	.014	16	36984.	-175
138	-17	22.6	.546	.097	.135	.022	13	36981.	-174
138	-16	20.6	.358	.088	.160	.020	18	36976.	-173
138	-15	18.8	.284	.027	.161	.014	14	36964.	-172
138	-14	17.3	.275	.027	.184	.013	8	36972.	-172
139	-12	55.3	.090	.011	.164	.054	8	23423.	-170
139	-11	55.2	.140	.063	.101	.003	10	28893.	-169
139	-10	55.1	.205	.097	.093	.006	12	31857.	-169
139	-9	54.7	.091	.003	.097	.012	8	32998.	-169
139	-8	54.0	.096	.009	.090	.010	9	32983.	-168
139	-7	53.2	.143	.033	.092	.005	9	33001.	-168
139	-6	52.2	.332	.190	.260	.224	5	32987.	-167
139	-5	51.3	.097	.016	.104	.009	12	32966.	-167
139	-4	50.4	.082	.002	.105	.005	6	32978.	-167
139	-3	48.9	.113	.017	.130	.033	10	32971.	-166
139	-2	47.5	.179	.059	.189	.121	9	32971.	-166
139	-1	45.8	.275	.162	.153	.056	5	32976.	-165
139	0	43.4	.157	.044	.129	.023	29	35008.	-165
139	1	40.4	.231	.130	.154	.039	14	34982.	-164
139	2	38.5	.471	.151	.146	.017	16	35004.	-164
139	3	36.5	.196	.054	.147	.019	16	35023.	-163
139	4	34.3	.179	.016	.167	.033	17	35015.	-163
139	5	32.1	.173	.021	.151	.014	16	35023.	-162
139	6	30.2	.313	.068	.158	.017	13	35003.	-162
139	7	28.1	.216	.037	.206	.038	17	37383.	-161
139	8	25.9	.226	.036	.373	.174	12	35030.	-161
139	9	24.0	.234	.048	.344	.169	15	36984.	-160
139	10	21.9	.185	.020	.335	.066	15	36990.	-160
139	11	20.7	.457	.353	.557	.006	2	36997.	-159
139	13	15.6	.250	.051	.358	.102	11	36985.	-158
139	14	13.8	.318	.041	.268	.026	17	36976.	-158
139	15	11.9	.303	.021	.282	.013	13	36992.	-158
140	21	87.2	.072	.034	.088	.001	25	27636.	-155
140	22	82.1	.296	.174	.090	.003	19	32016.	-152
140	23	76.8	.223	.109	.089	.002	17	32033.	-150
140	24	69.6	.124	.053	.092	.001	19	32032.	-147
140	25	64.5	.074	.002	.095	.002	19	32029.	-146
140	26	58.8	.088	.020	.103	.008	27	32023.	-143
140	27	52.3	.288	.078	.150	.056	15	32043.	-141
141	28	46.8	.393	.069	.137	.010	10	31969.	-138
141	29	39.7	.568	.009	.152	.003	5	34018.	-135
141	30	33.6	.602	.020	.173	.007	2	33991.	-132
141	31	25.4	.666	.017	.332	.005	4	36001.	-128
141	32	13.1	.591	.016	.317	.009	2	29042.	-123
141	33	12.2	.610	.024	.329	.010	11	29048.	-122
141	34	11.2	.565	.015	.344	.008	4	29030.	-122
0	2	3.4	-.000	******	.767	******	1	********	75

Table C5.

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — IR SENSOR (780NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
117	39	32.0	.437	.075	.191	.009	12	35011.	-123
117	40	30.6	.478	.108	.194	.009	10	35020.	-123
117	41	29.2	.463	.080	.191	.013	16	34988.	-123
117	42	27.7	.515	.064	.193	.014	12	34985.	-123
117	43	26.3	.358	.085	.204	.011	14	35016.	-123
117	44	24.9	.332	.025	.210	.018	15	34984.	-123
117	45	23.5	.305	.041	.254	.015	15	34983.	-123
117	46	22.1	.251	.018	.271	.009	15	34976.	-124
117	47	21.0	.275	.010	.264	.015	8	35014.	-124
124	36	67.4	.462	.123	.156	.006	8	18960.	-120
124	35	66.5	.472	.125	.135	.010	13	18952.	-120
124	34	64.2	.275	.037	.105	.013	20	30597.	-118
124	33	59.4	.251	.020	.085	.015	18	32986.	-115
124	32	53.2	.261	.018	.073	.003	28	32981.	-112
124	31	43.5	.320	.058	.086	.015	37	32975.	-108
124	30	26.5	.308	.029	.113	.017	8	33000.	-103
124	31	21.6	.337	.008	.118	.008	12	37011.	-95
124	32	19.4	.334	.010	.136	.009	17	36988.	-95
124	33	17.4	.355	.016	.156	.016	10	37011.	-94
124	34	16.2	.316	.023	.190	.011	2	37003.	-94
125	28	35.6	.043	.035	.079	.003	4	28699.	-95
125	27	34.6	.063	.002	.096	.014	8	30138.	-95
125	28	30.3	.299	******	.091	******	1	33015.	-96
125	29	29.2	.302	.006	.093	.004	13	33013.	-96
125	30	27.1	.327	.009	.094	.009	13	33010.	-96
125	31	25.2	.338	.005	.101	.010	10	33009.	-96
125	32	23.1	.337	.010	.113	.014	16	33036.	-95
125	33	21.0	.360	.006	.145	.024	13	33000.	-95
125	34	19.3	.302	.021	.165	.028	13	33024.	-94
125	35	17.7	.341	******	.204	******	1	33025.	-94
129	62	13.9	.706	.099	.304	.018	9	36970.	-150
129	61	14.8	.295	.124	.293	.020	12	36986.	-150
129	60	15.5	.319	******	.282	******	1	36967.	-149
131	51	15.7	.640	.014	.333	.006	4	33022.	-155
131	50	16.6	.714	.054	.342	.023	8	33024.	-155
131	49	17.9	.481	.036	.320	.015	5	33019.	-154
131	48	19.6	.582	.029	.282	.008	2	33018.	-154
131	47	20.7	.484	.088	.265	.014	11	33041.	-153
131	46	21.8	.326	.114	.234	.012	9	33057.	-153
131	45	23.2	.263	.050	.222	.009	12	33035.	-153
131	44	24.6	.260	.050	.222	.013	10	33036.	-152
131	43	26.2	.384	.070	.227	.020	14	33033.	-152
131	42	27.6	.446	.057	.253	.030	11	33016.	-152
131	41	29.1	.440	.092	.225	.037	13	33033.	-151
131	40	30.5	.606	.068	.243	.044	14	33050.	-151
131	39	31.9	.625	.030	.175	.027	12	33033.	-151
131	38	33.5	.651	.024	.153	.019	9	35905.	-151
131	37	35.1	.592	.041	.140	.020	13	36981.	-151
131	36	36.7	.534	.040	.135	.020	13	37004.	-151
131	35	38.2	.412	.120	.136	.019	12	37003.	-151
131	36	41.3	.606	.054	.123	.029	6	37025.	-151
131	33	42.9	.492	.016	.120	.022	2	36979.	-151
131	32	44.1	.144	.075	.128	.017	4	37066.	-151
131	30	46.2	.185	.080	.078	.008	3	36993.	-151
131	29	47.9	.483	.054	.130	.029	8	36957.	-152
131	28	49.5	.365	.072	.125	.033	5	36947.	-153
131	27	50.9	.160	.117	.118	.032	5	36958.	-153
131	26	52.7	.114	.035	.107	.029	14	36968.	-154
131	25	54.1	.185	.042	.089	.006	6	36968.	-155
131	24	56.2	.063	.020	.108	.024	7	36956.	-156

Table C5 (continued).

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — IR SENSOR (780NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
131	23	57.8	.041	.001	.100	.028	4	36946.	-156
131	22	59.3	.038	.000	.081	.007	3	36950.	-156
132	0	12.1	.176	******	.260	******	1	35024.	-170
132	-1	13.2	.157	.013	.238	.025	11	35016.	-170
132	-2	15.3	.284	.057	.238	.018	16	35025.	-169
132	-3	17.2	.227	.058	.253	.017	11	35015.	-169
132	-4	19.2	.130	.018	.264	.041	14	35018.	-169
132	-5	20.9	.122	.014	.219	.053	14	35010.	-168
132	-6	23.0	.167	.051	.222	.039	15	34982.	-168
132	-7	24.9	.173	.062	.164	.039	11	35710.	-168
132	-8	26.0	.406	.029	.129	.013	4	36984.	-167
132	-9	27.9	.278	.083	.169	.046	12	36976.	-167
132	-10	28.7	.099	.019	.186	.042	7	36996.	-168
132	-11	29.7	.086	.009	.150	.010	11	36974.	-168
132	-12	30.6	.152	.056	.141	.012	9	36997.	-169
137	-44	26.0	.779	******	.209	******	1	28993.	171
137	-45	25.8	.658	******	.155	******	1	30223.	170
137	-46	24.0	.847	.082	.176	.016	8	33026.	169
137	-47	23.1	.773	.109	.158	.014	13	33001.	169
137	-48	22.1	.520	.102	.151	.019	16	33008.	167
137	-49	21.1	.359	.092	.140	.020	11	32993.	166
137	-50	20.2	.380	.094	.144	.016	3	32989.	165
137	-49	19.6	.518	.158	.144	.023	30	33031.	165
137	-50	18.0	.809	.009	.165	.009	2	33020.	169
137	-51	16.5	.405	******	.136	******	1	33033.	168
138	-36	34.5	.353	.062	.222	.001	2	32990.	174
138	-35	35.0	.140	.041	.197	.028	8	33011.	174
138	-34	35.8	.114	.011	.199	.029	7	33258.	175
138	-33	36.3	.177	.039	.173	.017	11	35026.	175
138	-32	36.8	.413	.116	.162	.019	9	35023.	175
138	-31	37.4	.430	.059	.148	.021	4	35031.	175
138	-29	37.8	.195	.073	.139	.000	2	35012.	176
138	-28	37.9	.076	.013	.125	.005	3	35024.	176
138	-27	37.9	.206	.044	.125	.003	4	35014.	176
138	-26	37.8	.144	.081	.119	.007	3	35025.	176
138	-25	37.7	.087	.004	.132	.001	2	35038.	176
138	-24	36.1	.228	.133	.111	.067	8	36966.	177
138	-23	34.5	.094	.018	.155	.086	16	36982.	178
138	-22	32.3	.091	.033	.207	.097	12	36981.	-179
138	-21	30.5	.124	.034	.233	.076	21	36969.	-178
138	-20	28.4	.141	.053	.230	.105	16	36963.	-177
138	-19	26.3	.177	.051	.088	.022	14	36964.	-176
138	-18	24.6	.363	.113	.097	.025	13	36984.	-175
138	-17	22.5	.473	.109	.092	.016	10	36981.	-174
138	-16	20.6	.313	.103	.118	.012	14	36976.	-173
138	-15	18.7	.216	.038	.109	.013	11	36964.	-172
138	-14	17.3	.194	.026	.127	.008	6	36964.	-172
139	-12	55.3	.043	.003	.155	.063	5	24010.	-170
139	-11	55.3	.062	.015	.100	.032	5	28478.	-169
139	-10	55.6	.111	.113	.088	.029	6	32129.	-169
139	-9	54.7	.044	.002	.081	.014	3	32998.	-169
139	-8	54.0	.050	.013	.071	.010	4	32996.	-168
139	-7	53.3	.103	.042	.101	.030	11	32984.	-168
139	-6	52.5	.310	.157	.152	.097	7	32973.	-167
139	-5	51.3	.051	.017	.126	.031	13	32966.	-167
139	-4	50.3	.034	.002	.114	.029	12	32978.	-167
139	-3	49.0	.062	.017	.124	.027	12	32971.	-166
139	-2	47.5	.121	.063	.167	.114	10	32971.	-166
139	-1	45.8	.256	.201	.143	.058	4	32976.	-165

Table C5 (continued).

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — IR SENSOR (788NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
139	0	43.4	.117	.058	.128	.025	29	35024.	-165
139	1	40.3	.198	.133	.127	.029	14	34982.	-164
139	2	38.5	.420	.161	.138	.021	17	35004.	-164
139	3	36.5	.144	.060	.140	.021	15	35023.	-163
139	4	34.3	.123	.016	.160	.037	17	35015.	-163
139	5	32.1	.120	.022	.138	.018	12	35023.	-162
139	6	30.2	.254	.071	.141	.021	11	35005.	-162
139	7	28.0	.160	.043	.191	.034	15	37383.	-161
139	8	26.2	.143	.019	.239	.008	7	35030.	-161
139	9	23.7	.140	.017	.202	.038	10	36979.	-160
139	10	22.0	.123	.017	.288	.064	12	36990.	-160
139	13	15.4	.183	.064	.269	.047	8	36972.	-158
139	14	13.7	.235	.038	.216	.013	13	36976.	-158
139	15	12.1	.208	.015	.226	.016	9	36992.	-158
140	21	87.7	.035	.019	.079	.001	10	28230.	-155
140	22	81.9	.222	.123	.085	.028	6	32009.	-152
140	23	75.2	.206	.165	.073	.003	4	32036.	-149
140	24	71.4	.288	.175	.076	.001	10	32011.	-148
140	25	64.9	.034	.003	.081	.002	9	32041.	-146
140	26	58.4	.052	.020	.090	.007	13	32010.	-143
140	27	52.8	.315	.093	.230	.096	10	32028.	-140
141	28	45.6	.388	.098	.184	.010	17	31955.	-138
141	29	37.7	.578	.051	.192	.013	21	33985.	-135
141	30	32.5	.608	.029	.208	.018	27	34012.	-132
141	32	13.2	.559	******	.260	******	1	29042.	-123
141	33	12.2	.585	.026	.255	.008	9	29048.	-122
141	34	11.3	.524	******	.265	******	1	29037.	-122

Table C6.

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — PY SENSOR (350NM — 1100NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
117	39	32.0	.371	.072	.187	.008	12	35011.	-123
117	40	30.6	.414	.105	.193	.009	12	35020.	-123
117	41	29.2	.395	.079	.188	.012	16	34988.	-123
117	42	27.7	.451	.063	.192	.013	13	34985.	-123
117	43	26.3	.283	.090	.200	.011	14	35016.	-123
117	44	24.9	.260	.022	.206	.015	16	34984.	-123
117	45	23.5	.246	.031	.245	.014	16	34983.	-123
117	46	22.2	.200	.012	.263	.008	16	34976.	-124
117	47	20.9	.209	.016	.257	.013	10	35014.	-124
124	36	67.4	.375	.111	.148	.004	8	18960.	-120
124	35	66.5	.379	.118	.127	.010	13	18952.	-120
124	34	64.3	.205	.028	.095	.007	27	30597.	-118
124	33	59.9	.196	.017	.079	.007	30	32986.	-115
124	32	53.4	.192	.016	.067	.003	39	32981.	-112
124	31	44.4	.245	.057	.074	.007	58	32997.	-108
124	30	32.8	.200	.010	.106	.022	35	33000.	-103
124	31	21.6	.223	.010	.113	.007	14	37011.	-95
124	32	19.4	.215	.005	.130	.010	13	36988.	-95
124	33	17.3	.226	.009	.151	.015	17	37001.	-94
124	34	15.4	.201	.006	.189	.010	15	37003.	-94
124	35	13.6	.226	.014	.216	.014	12	36995.	-93
124	36	11.9	.240	.015	.288	.011	2	37004.	-93
125	28	35.6	.050	.043	.076	.002	3	28699.	-95
125	27	34.6	.075	.002	.100	.024	8	30138.	-95
125	29	28.9	.168	.007	.481	.003	2	33018.	-96
125	30	26.2	.211	******	.120	******	1	33021.	-96
125	31	25.6	.214	.003	.106	.020	9	33022.	-96
125	32	22.8	.221	.008	.119	.025	13	33005.	-95
125	33	21.0	.231	.004	.140	.021	15	33000.	-95
125	34	19.3	.206	.013	.155	.026	13	33024.	-94
125	35	17.3	.219	.014	.189	.017	14	33005.	-94
125	36	15.5	.204	.019	.231	.024	17	33023.	-94
125	37	13.5	.309	.111	.268	.017	11	33038.	-93
125	38	12.1	.364	******	.294	******	1	36993.	-93
127	39	12.6	.257	.067	.287	.010	2	36991.	-122
127	38	14.2	.270	.070	.244	.024	15	36997.	-121
127	37	16.2	.275	.050	.230	.028	16	36982.	-121
127	36	17.2	.445	.036	.237	.011	2	36994.	-120
129	65	11.2	.196	.014	.318	.029	5	36992.	-152
129	64	11.8	.192	.009	.317	.019	16	36985.	-152
129	63	12.7	.261	.120	.307	.020	12	37003.	-151
129	62	13.8	.618	.074	.302	.016	15	36996.	-151
129	61	14.9	.234	.097	.289	.017	15	36986.	-150
129	60	15.5	.266	******	.276	******	1	36967.	-149
131	55	11.3	.595	.011	.403	.004	3	33018.	-156
131	54	12.1	.574	.049	.377	.021	7	33043.	-156
131	53	13.2	.521	.057	.370	.011	13	33039.	-156
131	52	14.3	.390	.033	.353	.024	7	33018.	-155
131	51	15.6	.516	.042	.331	.020	10	33023.	-155
131	50	16.7	.611	.047	.339	.020	8	33024.	-155
131	49	17.9	.427	.035	.313	.016	7	33019.	-154
131	48	19.6	.493	.024	.274	.012	2	33018.	-154
131	47	20.7	.346	.071	.262	.020	11	33041.	-153

Table C6 (continued).

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — PY SENSOR (350NM — 1100NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
131	46	21.9	.295	.089	.230	.019	11	33057.	-153
131	45	23.2	.226	.039	.214	.011	12	33035.	-153
131	44	24.6	.229	.040	.210	.016	10	33036.	-152
131	43	26.2	.332	.057	.218	.023	14	33033.	-152
131	42	27.7	.394	.058	.243	.037	12	33016.	-152
131	41	29.1	.379	.077	.216	.042	13	33033.	-151
131	40	30.5	.516	.059	.227	.051	14	33050.	-151
131	39	31.9	.534	.025	.157	.021	12	33033.	-151
131	38	33.5	.560	.019	.155	.023	9	35905.	-151
131	37	35.0	.506	.033	.159	.022	13	36981.	-151
131	36	36.6	.462	.036	.138	.025	14	37004.	-151
131	35	38.3	.374	.099	.130	.045	15	37003.	-151
131	36	41.3	.529	.040	.099	.014	8	37025.	-151
131	33	42.6	.461	.037	.110	.012	2	37033.	-151
131	32	43.8	.218	.135	.087	.012	4	36981.	-151
131	29	47.9	.450	.063	.147	.067	7	36985.	-152
131	28	49.3	.329	.037	.081	.006	8	36947.	-153
131	27	51.2	.102	.083	.081	.004	5	36958.	-153
131	26	52.7	.103	.028	.088	.009	12	36968.	-154
131	25	54.6	.211	******	.085	******	1	36964.	-156
131	22	59.2	.043	.000	.072	.007	5	36973.	-156
132	0	11.7	.170	.004	.256	.026	11	35027.	-170
132	-1	13.2	.159	.011	.228	.023	14	35016.	-170
132	-2	15.4	.252	.042	.228	.015	17	35025.	-169
132	-3	17.3	.199	.050	.250	.027	15	35014.	-169
132	-4	19.3	.131	.013	.264	.052	15	35018.	-169
132	-5	21.1	.124	.017	.247	.097	15	35010.	-168
132	-6	23.0	.155	.036	.208	.036	17	34982.	-168
132	-7	25.0	.159	.045	.147	.044	13	35710.	-168
132	-8	26.6	.293	.051	.294	.133	13	36984.	-167
132	-9	27.8	.243	.071	.154	.065	17	36976.	-167
132	-10	28.8	.094	.014	.190	.051	10	36996.	-168
132	-11	29.8	.087	.006	.120	.027	14	36974.	-168
132	-12	30.5	.120	.041	.101	.033	6	37003.	-169
137	-44	26.1	.740	.074	.298	.200	2	27891.	171
137	-45	25.4	.519	.109	.253	.034	4	30223.	170
137	-46	24.0	.739	.067	.189	.018	9	33026.	169
137	-47	23.1	.657	.083	.174	.016	13	33001.	169
137	-48	22.0	.458	.090	.171	.028	17	33008.	167
137	-49	21.0	.331	.082	.161	.027	18	32993.	166
137	-50	20.2	.334	.077	.149	.016	3	32989.	165
137	-49	19.6	.467	.125	.156	.021	28	33014.	166
137	-50	18.2	.719	.010	.224	.009	2	33020.	169
137	-52	15.8	.374	.024	.206	.043	3	32995.	168
137	-40	29.7	.359	.022	.190	.020	2	31019.	173
138	-37	33.1	.219	******	.120	******	1	32998.	174
138	-33	36.5	.171	******	.072	******	1	35003.	175
138	-32	36.9	.414	.068	.072	.010	2	35038.	175
138	-31	37.3	.418	.059	.074	.006	5	35022.	175
138	-30	37.5	.541	.171	.070	.002	5	35029.	176
138	-29	37.8	.193	.077	.059	.004	3	35030.	176
138	-28	37.9	.083	.021	.059	.004	4	35018.	176
138	-27	37.9	.187	.050	.057	.005	3	35005.	176
138	-26	37.9	.137	.060	.056	.005	3	35025.	176
138	-25	37.7	.086	.008	.061	.011	4	35031.	176
138	-24	36.3	.191	.092	.079	.035	16	36972.	177
138	-23	34.6	.092	.013	.134	.080	20	36982.	178
138	-22	32.5	.086	.025	.179	.121	18	36968.	-179
138	-21	30.5	.118	.027	.221	.083	20	36969.	-178
138	-20	28.4	.131	.041	.208	.105	17	36963.	-177

Table C6 (continued).

DIFFUSE TO TOTAL RATIOS FROM CV990 MAY 1983 — PY SENSOR (350NM — 1100NM)

DOY	LAT	SO.EL.	ALBE.	AL.SD.	DI/TO	DT.SD.	N	PALT	LONG
138	-19	26.4	.156	.038	.079	.011	17	36984.	-176
138	-16	24.5	.318	.091	.099	.025	14	36984.	-175
138	-17	22.5	.399	.062	.098	.024	13	36981.	-174
138	-16	20.5	.284	.062	.117	.016	16	36978.	-173
138	-15	18.7	.190	.020	.123	.015	14	36964.	-172
138	-14	17.3	.171	.020	.137	.014	6	36972.	-172
139	-12	55.3	.055	.010	.114	.043	8	23423.	-170
139	-11	55.3	.068	.016	.080	.003	8	28478.	-169
139	-10	55.0	.115	.076	.072	.004	11	32439.	-169
139	-9	54.6	.050	.002	.088	.015	6	32979.	-169
139	-8	54.1	.054	.007	.077	.018	10	32985.	-168
139	-7	53.3	.091	.031	.073	.006	11	32984.	-168
139	-6	52.4	.257	.129	.204	.187	8	32973.	-167
139	-5	51.4	.057	.014	.092	.022	9	32966.	-167
139	-4	50.4	.042	.001	.097	.026	10	32978.	-167
139	-3	49.1	.063	.012	.103	.027	12	32971.	-166
139	-2	47.5	.112	.048	.169	.110	11	32971.	-166
139	-1	45.9	.288	.244	.147	.063	6	32976.	-165
139	0	43.3	.103	.044	.113	.025	33	35024.	-165
139	1	40.4	.166	.105	.118	.022	15	34982.	-164
139	2	38.5	.351	.130	.127	.015	17	35004.	-164
139	3	36.4	.126	.045	.124	.025	15	35023.	-163
139	4	34.3	.115	.012	.144	.034	15	35015.	-163
139	5	32.1	.109	.017	.133	.019	16	35023.	-162
139	6	30.2	.223	.054	.143	.021	14	35005.	-162
139	7	28.1	.142	.031	.180	.040	17	37383.	-161
139	8	25.9	.152	.035	.350	.173	12	35030.	-161
139	9	23.9	.155	.046	.292	.150	16	36984.	-160
139	10	21.9	.115	.014	.295	.071	14	36990.	-160
139	11	20.6	.601	******	.528	******	1	36994.	-159
139	13	15.6	.160	.041	.309	.104	12	36985.	-158
139	14	13.9	.215	.038	.228	.049	16	36976.	-158
139	15	11.8	.192	.015	.227	.010	13	36992.	-158
140	21	87.4	.042	.019	.073	.001	21	27636.	-155
140	22	81.8	.249	.114	.074	.001	13	32822.	-152
140	23	76.5	.169	.038	.072	.001	20	32842.	-150
140	24	70.3	.139	.127	.076	.002	20	32827.	-148
140	25	65.3	.039	.002	.079	.002	16	32841.	-146
140	26	58.5	.058	.021	.091	.012	19	32823.	-143
140	27	52.6	.229	.082	.140	.062	17	32828.	-141
141	28	46.3	.328	.072	.115	.008	14	31985.	-138
141	29	38.9	.480	.029	.126	.006	11	34001.	-135
141	30	30.1	.520	.024	.195	.029	29	34016.	-132
141	31	23.4	.560	.027	.237	.022	36	36003.	-129
141	32	13.1	.464	.014	.249	.014	2	29042.	-123
141	33	12.1	.475	.023	.255	.008	12	29048.	-122
141	34	11.2	.441	.011	.260	.006	4	29030.	-122